

CLAIMS

1. A digital amplifier, in which a driving circuit drives switching elements in response to an audio signal that has been converted into a 1-bit signal, and an amplitude of the audio signal is amplified by switching a power source voltage, comprising:

variable power source voltage generating means for generating the power source voltage which is variable; and

driving voltage variation means for varying a driving voltage by which the driving circuit drives the switching elements.

2. The digital amplifier as set forth in claim 1, wherein:

the variable power source voltage generating means includes a low pass filter for smoothing a pulse width modulation signal obtained by switching a predetermined direct current voltage in a duty variable manner, and

the driving voltage variation means includes:

a capacitor whose one terminal receives the pulse width modulation signal;

a diode for inputting a predetermined constant voltage into an other terminal of the capacitor; and

a low pass filter for smoothing an output from the other terminal of the capacitor, wherein a voltage obtained by

adding the constant voltage to the power source voltage is supplied to the driving circuit as the driving voltage.

3. A digital signal reproduction device, comprising:

5 a reproduction circuit for demodulating and developing sound data, obtained from a rewritable optical storage medium, which has been modulated and compressed for storage; and

an amplifier for amplifying the sound data, wherein

10 the amplifier is the digital amplifier as set forth in claim 1 or 2.

4. The digital signal reproduction device as set forth in claim 3, wherein the optical storage medium is a minidisk.

15 5. A volume control device, which controls an amplitude of an output signal outputted from a digital amplifier having amplification means for performing switching amplification with respect to an audio signal converted into a 1-bit signal, comprising:

20 amplitude variation means for varying an amplitude of the audio signal, which has not been converted into the 1-bit signal, into an amplitude increased by a predetermined scale factor;

25 a voltage variation means for varying a power source

voltage supplied to the amplification means into a voltage having a specified voltage value; and

5 setting control means for setting the scale factor to be constant when the amplitude is set to be between a maximum value and a predetermined intermediate value, and setting the voltage value to be a value corresponding to a specified input volume value, and setting the voltage value to be constant when the amplitude is set to be between the intermediate value and a minimum value, and setting the scale factor to be
10 a value corresponding to the specified input volume value.

6. The volume control device as set forth in claim 5, wherein the setting control means includes storage means for storing the scale factor and the voltage value that correspond
15 to the input volume value, and the setting control means, on the basis of the input volume value that has been specified, outputs the scale factor and the voltage value that correspond to the input volume value.

20 7. The volume control device as set forth in claim 5, wherein the setting control means sets the voltage value to be 0.1 times as large as a maximum value when the amplitude is set to be between the intermediate value and the minimum value.

8. The volume control device as set forth in claim 5, comprising:

a driving circuit for driving switching elements, provided in the amplification means, in response to the audio signal that has been converted into the 1-bit signal; and

driving voltage variation means for varying a driving voltage, by which the driving circuit drives the switching elements, so as to correspond to voltage variation caused by the voltage variation means.

9. The volume control device as set forth in claim 8, wherein:

the voltage variation means includes a low pass filter for smoothing a pulse width modulation signal obtained by switching a predetermined direct current voltage in a duty variable manner, and

the driving voltage variation means includes:

a capacitor whose one terminal receives the pulse width modulation signal;

a diode for inputting a predetermined constant voltage into an other terminal of the capacitor; and

a low pass filter for smoothing an output from the other terminal of the capacitor, wherein a voltage obtained by adding the constant voltage to the power source voltage is supplied to the driving circuit as the driving voltage.

10. A digital amplifier, comprising:

the volume control device as set forth in any one of claims 5 to 9;

5 1-bit conversion means for converting the audio signal into the 1-bit signal; and
the amplification means.

11. A digital signal reproduction device, comprising:

10 a reproduction circuit for demodulating and developing sound data, obtained from a rewritable optical storage medium, which has been modulated and compressed for storage; and

an amplifier for amplifying the sound data, wherein
15 the amplifier is the digital amplifier as set forth in claim 10.

12. The digital signal reproduction device as set forth in claim 11, wherein the optical storage medium is a minidisk.